## REMARKS

Claims 1-18 and 25-39 are all the claims pending in the application. By this Amendment Applicant cancels claims 19-24 and editorially amends claims 1 and 10 to clarify the invention. Claim 2 is rewritten in its independent form.

Summary of the Office Action

The Examiner withdrew the objections to the Abstract and rejection of claims 1-18 and 25-39 under 35 U.S.C. § 112, second paragraph. The Examiner, however, maintained the rejections of claims 1, 3-5, and 8-11 under 35 U.S.C. § 102(b). In addition, the Examiner has indicated that claims 6, 7, 16-18, and 25-39 are allowed and claims 2 and 12-15 contain allowable subject matter.

Preliminary Matters

As a preliminary matter, Applicant thanks the Examiner for acknowledging the receipt of certified copy of the priority document and for withdrawing objection to the specification and rejections under 35 U.S.C. § 112, second paragraph.

Claim Rejections

The Examiner rejected claims 1, 3-5, and 8-11 under 35 U.S.C. § 102(b) as being allegedly anticipated by Hodges. Applicant respectfully traverses this rejection and respectfully requests the Examiner to ***carefully reconsider*** the rejection in view of the comments, which follow.

*Claims 1 and 3-5*

Of these claims, only claim 1 is independent. Claim 1, as now amended, recites a novel combination of features including: "estimating the running state of the vehicle as a whole by determining at least one of a condition of a road surface on which the vehicle is running and a running state of each tire." The Examiner asserts that claim 1 is directed to a method of estimating the running state of the vehicle and is anticipated by Hodges. The Examiner asserts that Hodges' measuring "the acceleration of each wheel hub which accelerates (*i.e.* vibrates) due to the condition of the road surface is in fact 'estimating the running state of the vehicle by determining the condition of the road surface'" (see page 6 of the Office Action). This ground of rejection is technically incorrect. Hodges' discussion of the acceleration of each wheel hub is clearly different from estimating the running state of the vehicle as whole, as set forth in claim 1.

Hodges teaches a method and an apparatus for measuring the physical profile of a road surface, its roughness *e.g.*, the presence of bumps (col. 1, lines 40 to 51). Specifically, Hodges teaches using a combination of the measured acceleration and force at the wheel hub, along with other characteristics of the tire, to determine the vertical elevation of the road surface (col. 6, lines 40 to 60). Hodges teaches using a force transducer and an accelerometer to measure vertical force and acceleration, respectively, at each of the four wheels (col. 4, lines 18 to 46).

Hodges, however, teaches detecting "vertical displacement x of the wheel/terrain interface to provide a road/terrain profile". The Examiner alleges that col. 13, lines 16 to 20 teach estimating the running state of the vehicle by determining at least one of a condition of a road surface on which the vehicle is running and a running state of each tire (see page 4 of the

Office Action). Col. 13, lines 16 to 20 recite: "processing the force and acceleration measurements of said forward and rear measuring wheels to determine a coherence function between the road elevation profiles of said front and rear wheels and left and right wheels." As is clear from this passage, Hodges is directed to measuring the profile of the road by comparing the measurements of one wheel to another wheel. In other words, the passage relied on by the Examiner clearly fails to teach or suggest estimating the running state of the vehicle as a whole based on the determined road surface conditions and/or the running state of the tires.

Next, the Examiner alleges that "the acceleration of a wheel hub" is equivalent to the running state of the vehicle (see page 6 of the Office Action). Hodges, however, only teaches calculating or measuring qualities with respect to a single wheel or tire, and then manipulating these calculations to obtain the road profile. In short, Hodges fails to teach or suggest calculating the running state of the vehicle as whole at least because additional calculations would be required to determine the running state of the vehicle as a whole from calculating the acceleration of each wheel hub.

Moreover, the Examiner appears to equate calculating acceleration due to the condition of the road surface with determining the running state of the vehicle by determining the condition of the road (see page 6 of the Office Action). *Assuming arguendo* that calculating acceleration at a wheel hub can somehow be equated to calculating the running state of the vehicle as a whole, Hodges teachings can be thought of as an antithesis of the invention as set forth in claim 1. Hodges teaches determining road conditions by estimating the acceleration at each wheel. The acceleration at each wheel is not estimated by determining the conditions of the

road surface. In fact, in Hodges, determining the condition of the road surface is a result obtained from the measured acceleration rates. In sum, Hodges teaches acquiring data at each of the wheels and treating each wheel independently to determine the profile of the road.

In short, "estimating the running state of the vehicle as a whole by determining at least one of a condition of a road surface on which the vehicle is running and a running state of each tire" is not unequivocally disclosed by Hodges, which lacks estimating the running state of the vehicle as a whole and estimating the running state of the vehicle by determining the condition of a road surface or running state of each tire. For at least these exemplary reasons, independent claim 1 is patentably distinguishable from Hodges and it is appropriate and necessary for the Examiner to withdraw this rejection of independent claim 1 and its dependent claims 3-5.

*Claim 8*

Next, Applicant respectfully traverses this rejection with respect to the independent claim 8. Claim 8 recites a novel combination including: "means for calculating a vibration level at a predetermined frequency band by analyzing the frequency of the detected vibration level." The Examiner asserts that claim 8 is directed to an apparatus for estimating the running state of the vehicle and is anticipated by Hodges.

In particular, the Examiner asserts that since Hodges teaches "all frequencies as recognized by the Applicant, the prior art does teach a predetermined frequency band as claimed by the Applicant because the Applicant has only claimed the broad phrase 'predetermined frequency band' and has never claimed the limits of said frequency band," (see page 7 of the Office Action). This ground of rejection is submitted to be incorrect as a legal matter.

The Examiner appears to allege that without specifying the limits for the frequency band, the term "predetermined" is given no patentable weight. It is respectfully pointed out that this is incorrect as a legal matter. MPEP § 2111.01 requires that the terms be given their plain meaning. For example, in *Ferguson Beauregard/Logic Controls v. Mega Systems, LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003), the Federal Circuit affirmed that the ordinary meaning of the term "predetermine" is "to determine beforehand," *also see Desper Prods. V. Osound Lab*, 157 F.3d 1325 (Fed. Cir. 1998).

Moreover, an illustrative, non-limiting embodiment of the present invention discloses that at certain frequency bands, the vibration level changes significantly in accordance with the condition of the road surface, whereas at other frequency bands, the vibration levels are hardly affected by the conditions of the road. Thereby, by calculating a vibration level at a predetermined frequency band, road conditions may be calculated more accurately. This passage is provided by way of an example only and is not intended to limit the scope of the claims in any way.

Hodges only teaches eliminating errors by performing manipulations in frequency domain using Fourier Transformations. This methodology provides for the determination of the spectrum of the roadway perturbations in the frequency domain. This allows for the quantification of amplified perturbation inputs while maintaining the same relative amplitude of input at all frequencies (col. 3, lines 40 to 52). Hodges further teaches having a statistical representation of the road elevation as a function of frequency (col. 7, lines 30 to 57).

Hodges, however, just teaches obtaining vertical displacement by using frequency domain. That is, frequency is used to obtain X(f, T), Fourier Transform of the elevation versus distance profile of the terrain. Hodges fails to teach or suggest calculating a vibration level at a predetermined frequency band. In fact, Hodges uses all frequencies to find X(f, T) and there is no frequency band that is determined beforehand for calculating the vibration level.

In addition, claim 8 contains features similar to the features argued above with respect to claim 1, namely, estimating the running state of the vehicle. Those arguments are respectfully submitted to apply with equal force here.

Therefore, the novel combination of claim 8 including *calculating a vibration level at a predetermined frequency band* is not suggested or taught by Hodges, which lacks calculating vertical displacement at a predetermined frequency band. For at least these reasons, Applicant respectfully submits that independent claim 8 is patentably distinguishable from Hodges. Therefore, Applicant respectfully requests the Examiner to reconsider and to withdraw this rejection of independent claim 8.

*Claim 9*

Next, Applicant respectfully traverses the rejection with respect to the independent claim 9. Claim 9 recites a novel combination including: "road surface condition estimation means for estimating condition of a road surface from a value obtained by carrying out an operation on at least two vibration levels at different frequency bands by analyzing the frequency of the detected vibration level." The Examiner asserts that claim 9 is directed to an apparatus for vehicle estimating the running state of the vehicle and is anticipated by Hodges.

The Examiner asserts that Hodges' teaches "acceleration of each wheel hub (*i.e.* vibration) measured in order to determine the profile of the road, and since the road profile is an irregular surface, each wheel hub is going to vibrate in different frequency band. As such, the prior art is deemed as suggesting the Applicant's claimed subject matter [carrying out an operation on at least two vibration levels at different frequency bands]" (see page 7 of the Office Action). That is, the Examiner appears to allege that each wheel is analyzed separately, thereby each wheel has its own unique vibration level/frequency band measurement.

It is respectfully pointed out that the argument with respect to claim 9 presented in the Amendment under 37 C.F.R. § 1.111 filed on March 16, 2004, was directed to the fact that Hodges fails to teach or suggest having one detected vibration level analyzed at two or more vibration levels at different frequency bands. For example, an illustrative, non-limiting embodiment of the present invention discloses using the detected vibration level to determine the road conditions by analyzing this detected vibration level by performing operation on at least two vibration levels at different frequency bands. In this exemplary embodiment, the two frequency bands are one which is not effected by the condition of the road surface and another that is effected by the road surface (*e.g.* Fig. 9). This passage is provided by way of an example only, and is not intended to limit the scope of the claims.

As acknowledged by the Examiner, Hodges teaches measuring each wheel independently. Therefore, these alleged "vibration levels" are acquired from different sources, one for each wheel. That is, Hodges fails to teach or suggest obtaining at least two vibration levels at different frequency bands by analyzing the frequency of the detected vibration level. In

short, in Hodges, one detected alleged vibration level will be analyzed separately but one detected vibration level will not be used to obtain at least two vibration levels at different frequency bands.

Therefore, the novel combination of claim 9 including *a value obtained by carrying out an operation on at least two vibration levels at different frequency bands by analyzing the frequency of the detected vibration level* is not suggested or taught by Hodges, which lacks calculating vertical displacement by analyzing detected vibration coming from one source at two different frequency bands. For at least these reasons, Applicant respectfully submits that independent claim 9 is patentably distinguishable from Hodges. Therefore, Applicant respectfully requests the Examiner to reconsider and to withdraw this rejection of independent claim 9.

*Claim 10*

Next, Applicant respectfully traverses this rejection with respect to the independent claim 10. Claim 10 recites a novel combination including: "means of detecting vibration levels of at least two points on a portion of a tire below a spring of the running vehicle [and] means of calculating a vibration transmission level at a predetermined frequency band between said at least two vibration detection points." The Examiner asserts that claim 10 is directed to an apparatus for estimating the running state of the vehicle and is anticipated by Hodges. Specifically, the Examiner asserts that Hodges' teaches analyzing each wheel separately, thereby each wheel has its own unique vibration level/frequency band measurement. As such, the Examiner alleges that Hodges teaches "calculating a vibration level of one wheel hub and the

vibration level of another wheel hub. These vibration levels are deemed as vibration transmission levels." (page 8 of the Office Action). This ground of rejection is incorrect as a technical matter.

For example, as acknowledged by the Examiner, Hodges teaches measuring each wheel independently, thereby obtaining individual values. But the reference fails to teach or suggest calculating a vibration transmission level between at least two points. In Hodges, the "point" obtained by one wheel is processed independently from the point obtained at another wheel. In other words, the vibration transmission levels are not being determined between two points.

Moreover, in Hodges, the coherence function is calculated by comparing terrain elevation at the various wheels. That is, the coherence function is calculated by comparing the detected acceleration on each wheel with each other (col. 9, line 25 to 61). Hodges, however, only teaches detecting one point on each wheel. Moreover, Hodges only teaches comparing the values from different wheels to obtain the road profile. In short, Hodges clearly fails to teach or suggest detecting various points on a single tire.

In addition, claim 10 recites a feature similar to a feature argued above with respect to claim 8, namely calculating a vibration transmission level at a predetermined frequency band. Since claim 10 contains features that are similar to the features argued above with respect to claim 8, those arguments are respectfully submitted to apply with equal force here.

Therefore, the novel combination of claim 10 including: *means of detecting vibration levels of at least two points on a portion of a tire below a spring of the running vehicle* and *means of calculating a vibration transmission level at a predetermined frequency band between*

*said at least two vibration detection points* is not suggested or taught by Hodges, which lacks having two detection points on a same tire and calculating a vibration transmission level between this two point at a predetermined frequency band.

For at least these reasons, Applicant respectfully submits that independent claim 10 is patentably distinguishable from Hodges. Therefore, Applicant respectfully requests the Examiner to reconsider and to withdraw this rejection of independent claim 10. In addition, claim 11 is patentable at least by virtue of its dependency on claim 10.

Allowable Subject Matter

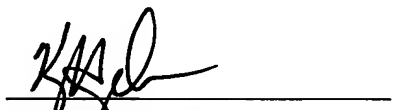
Applicant thanks the Examiner for indicating that claims 6, 7, 16-18, 25-39 are allowed and for indicating that claims 2 and 12-15 contain allowable subject matter. Applicant rewrites claim 2 in its independent form. With respect to claims 12-15, however, Applicant respectfully holds the rewriting of these claims in abeyance until arguments submitted with respect to the independent claim 8 have been reconsidered.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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